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in the book for an account of the gar pike and the dogfish or Amia because of their special interest in these fishes. They are, however, neither food nor game fishes, and are so well known in special works in zoölogy that ready reference to them can easily be had elsewhere.

While this work will not fail to interest the general reader, it will be most highly appreciated by those who really wish to know fishes. To the students of natural history in our high schools and colleges the book will be especially useful, as it is a strictly up-to-date systematic treatise and contains a vast amount of accurate natural history information. By means of keys, descriptions and the illustrations any student of ordinary intelligence can easily identify all of our food and game fishes which he may have.

To the angler it is indispensable, for it tells him where the different game fishes are to be found, and will enable him to readily identify any fish he may catch, and to know it by its correct scientific as well as its common name.

S. E. MEEK.

**Notes on Recent Fish Literature.**— In connection with the elaborate investigation of the fishes and fisheries of the Hawaiian Islands, undertaken by the United States Fish Commission in 1901 and 1902, Messrs. Jordan and Evermann, who have the work in charge, have published accounts of part of the new species obtained. In this preliminary paper (*Bull. U. S. Fish. Comm.* for 1902) 56 new species are described. These will be figured with all the known species in a final report. The Hawaiian Fauna is much less rich in the species than that of Samoa, and while the Genera are all distinctly tropical, the species are very largely different from those found in Polynesia and Micronesia. This isolation of the Hawaiian Fauna is in part explained by the direction of the ocean currents, which set to the eastward in Samoa and Tahiti, but to the westward about Hawaii. The new Genera in this paper are the following: Fowleria (Apogonidæ), Bowersia (Lutianidæ), Verriculus (Labridæ) Quisquilius and Vitraria (Gobiidæ), and Osurus (Pteroprarida).

In the *Annals and Magazine of Natural History* (Vol. II, No. 63), Mr. C. Tate Ragan of the British Museum gives a review of the angler fishes of the family of Laphiidæ. Three genera are recognized: Chirolophius (*naresi*), Lopheonius and Lophius. *Lopheonius spelurus* Garman, from off Panama, is referred to Chirolophius. The species described by the present writer from Japan as *Lopheonius litulon*, is as Ragan suggests, a true Lophius, having 27 vertebræ, while the other Japanese species, externally extremely similar, *Lopheonius setigerus* has but 17 or 18. The former is a species of northern distribution. It is remarkable that so great a difference in the vertebral column should be developed without any considerable external distinction. About 15 species of anglers are now known.

Dr. Tarleton H. Bean has published a useful account of the habits and distribution of the fishes found on Long Island. It occurs in the *Annual Report of the Forest, Fish and Game Commission of New York*, 1901.

A new writer on Ichthyology, Senhor Alipio de Miranda Ribeiro, gives an account of eight fishes from Rio Pomba in a report of the *Sociedade Naciondl de Agricultura* for 1902. For the genus usually called Centropomus, Ribeiro uses the name Platycephalus, "in observance of the laws of priority."

Mr. Cloudsley Rutter, naturalist of the "Albatross," describes the fishes obtained by him in the lakes of North Eastern California (*Bull. U. S. Fish Commission* for 1902). Most of these lakes are without outlet, although formerly tributary to the post-glacial Lake Lahontau. The new species are *Pautorteus lahontau* from Susan River, *Chasmistes chamberlaini* from Eagle Lake, and *Agosia robusta* from Susan River and other streams.

Mr. Rutter also gives a report (*Bull. U. S. Fish Commission* for 1902), on five years' work (1896–1901) of observation on the habits of the Sacramento salmon. It is a very complete and valuable piece of work. Among the important conclusions are these:—

There is no evidence that salmon returning to spawn seek their native stream. Probably most salmon do not wander far into the sea, and the native river is the nearest one when the spawning season comes. There is no evidence that they remember any particular branch of the river basin in which they were spawned. Most salmon return to spawn after two years in the sea, some remaining three and others four years.

All die after spawning, none making any effort to return to the sea. Most of them die within 5 to 16 days after reaching the spawning grounds. They will not survive if placed in salt water. The Pacific salmon are like cast off leaves of a tree, when their period of usefulness to the species is past.

In the *Proceedings of the United States National Museum* (Vol. XXVI) Messrs. Jordan and Fowler continue their discussions of

Japanese fishes. The Elasmobranchs, or sharks, rays and chimæras are represented by 56 species. Other papers are on the Cobitidæ or Loaches, six species in Japan, and on the Cepolidæ or Band-fishes, of which Japan has three. The genera, Embolichthys and Zen are subjects of a special paper.

In the *Annotationes Zoologicæ Japonenses* (Vol. IV) of the Imperial University of Tokyo, Dr. Bashford Dean gives an account of the cleavage of the egg in the cestraciont shark *Heterodontus japonicus*. He finds on the egg certain marks or lines reminiscent of holoblastic cleavage. D. S. J.

**Gardiner's "Maldive and Laccadive Archipelagoes," Part IV.**[1]— The fourth part of Gardiner's Fauna and Geography contains seven papers including a detailed description, with charts, of the Atolls and Banks— a valuable contribution to geography but not abstractable. In his concluding notes Gardiner touches on the causes of deaths of parts of the coral reefs. Silting up is destructive and senile decay, after the colony has reached a great size, causes great mortality.

The Cephalochorda are described systematically and anatomically by C. F. Cooper while R. C. Punnett considers their variation. A new species, *Heteropleuron maldivense* is described. In the conclusions as to the great variability of Cephalochorda based on the number of myotomes the possibility of an increase in the number of myotomes throughout life is not sufficiently considered.

The Avifauna is analyzed by Gadow. Twenty-six species were examined; none peculiar to the islands. The permanent residents are, excepting the Indian crow, *Corvus splendens*, all water birds, mostly of wide distribution in the Old World. Eight genera of birds are winter visitors from the Asiatic continent and a few species are wanderers from India and Ceylon. Finches, starlings and pigeons are wholly absent. At one point in the Archipelago it was observed that all birds retired daily from 11 A. M. to 3 P. M.

The earthworms are reported upon by Beddard. He comments on the favorable material afforded by this group for studies in geographic variation owing to impracticability of their unassisted migration over a tract of sea. Three species are recorded, two are very common

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[1] *The Fauna and Geography of the Maldive and Laccadive Archipelagoes*, etc. Edited by J. Stanley Gardiner. Cambridge University Press, 1903. Vol. i, pt. iv, pp. xix+348–471, pls. 18–25, text figs. 76–119.